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A Hybrid Wireless Pressure Sensor (Hwps) Concept On 2d Wireless Real-Time Application

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In this paper, the research on hybrid wireless pressure sensor (HWPS) concept on 2D wireless real-time application is welcome. Thismethod emphasisedand address the anomalies problems, attenuation problems on pressure sensor signal and the Loss time response problemsacquired during signal transmission of above 100meters that resulted to erraticraw data parameter display on the real-time software programand wrong pressure reading problem acquired along the process.This method generates signals from the Wi-Fi connect antenna embedded on the sensor and the wireless real-time device send a corresponding I.P Address that matches the communicating sensor. The experimental simulation result was performed on HMI real-time software with Orion application, Laptop with 2.30GHz processor, 111GB Hard disk, 2.00GB Memory, Wireless pressure sensor with embedded antenna and Software dongle analyser.
Keywords: Pressures, Sensor, Wireless, Real-time, Well Intervention, Well head, LAN (Local area network), Analysis, Wi-Fi connect,HUB (Helping U Better),Tx (Transmission of signal),Rx (Receiving of signal), PSI (Pounds per Square inch), IP (Internet protocol), DAS (Data acquisition systems), 2D (Two dimension).

Introduction

The experimental analysis of the wirelessreal-time raw data and graph display, play a major role to demonstrate the signal sensingof the wireless pressure sensor which apply I.P Address route on the Wi-Fi connect path transporting from the wireless sensor path to the 2D wireless real-time path. In this paper, the constrained acquired from the earlier wired pressure sensor type unto the wireless pressure sensor type developed create pressure error and pose a big problem when a longdistance cable coverage is considered. To solve these problems, a wireless pressure sensor concept on 2D is applied on wireless real-time applicationby assigning anembedded antenna to both wireless and use Wi-Fi connect to develop an I.P Addresses networkpath to both wireless antennas, which would gradually eliminate attenuation and Losstime and cover above 300meter [5]. As pressure is detected from thewell source, the wireless pressure sensor automatically send a correspondingI.Paddress through the Wi-Fi connect that matches with the I.P address ofthe wireless real-time application obtained from the embedded antennaand simultaneously display the amountof pressure captured from the source to the HMI real-time device [7, 6].

Similar works have been carried out inrecent time as a Literature updates such include; Park et al. [1, 8].They demonstrated that the wireless pressure sensor is aresonance circuit that can be usedwithout the internal power source and is detected by an external antenna which have a pressure change.

Takahata et al. [2, 11]. In their paper, they reported that amicro-machined capacitive pressure sensor required mechanical robustness and the structure eliminate both the vacuum cavity and the associated lead transfer for polyurethane rubber.

Bogdan et al. [3, 10].They demonstrated that managing information support required connecting the virtual labs to the processes of temperature, vibration data acquisition and Real-time process control using 802.11b/g communication protocol based data acquisition system (DAS).

Russ et al. [4, 9]. In their report, they had an overview of a powerful approach that visualizes manufacturing that will greatly reduce the learning curve for developing human machine interface (HMI) application.

Problem Identification

This section highlight the problem acquired from the wired pressure sensor applied on the wired real–time using Local area network (LAN) network which prompt anomalies, attenuation in signal and Loss time response that resulted to erratic parameter pressure display and wrong pressure reading

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as Local area network cannot accommodate more than 100meters long. The problem statements generated from the (HWPS) concept as problem identified, is illustrated on the fig.[1], [2] and [3].

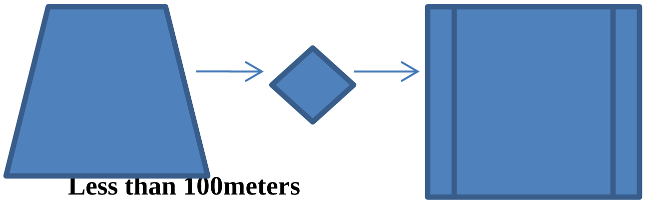


Fig.[2]. A LAN HUB
Fig.[1]. Shows wired pressure sensor
Fig.[3]. Shows wired HMI Real-time

The question asked on (HWPS) concept on 2D wireless real-time application as problem statements includes;

(1).Is there any anomalies in signal when wired pressure sensor is used?

(2). Is there any attenuation in signal when wired pressure sensor is applied.

(3). Is there any real-time application conversion from LAN, WANand Wi-Fi connect application?

(4). Is there any loss time response in the concept?

(5). Is there any simulation applicable in the concept for wireless real-time application?

(6). Is there any internet protocol (I.P) Address route on any Wi-Fi connect path?

Solution Proposed

This section highlight the solution proposed on the hybrid wireless pressure sensor (HWPS) concept on 2D wireless real-time application for the problem identified in section 2.

Definition Of Terms

This section explained the definition of terms used in the (HWPS) concept.

(1). **LAN**: This is local area network that is programmed for wired sending and receiving network within a maximum of 100meters long.
(2). **WAN**: This is wide area network that is programmed for wireless sending and receiving network above 100meters long.

(3). **HMI**: This is human machine interface that is programmed as a network interface between human monitor application and machine monitor application.

(4). **I.P ADDRESS**: This is an internet protocol that is used to communication and assign a path route for network addresses between two communication interface for sending and receiving network within and outside the network box.

(5). **Wi-Fi CONNECT**: This is wireless interface to frequency interface connect for wireless sending and receiving network addresses of signal communication.

(6). **ANTENNA**: This is an embedded signal pole mounted on a device for transmitting and receiving signal network.

(7). **DAS**: This is real-time data acquisition system designed and programmed for signal parameter capture on real-time application network.

The (Hwps)Application

This section highlighted the concept application used to solve the problems identified in section 2 and also pronounced as a solution in section 3.

The wireless embedded antenna of the pressure sensor captured the amount of pressure generated from the source during well intervention and send out signal from the antenna through the embedded wireless microchip on the antenna by the power of transmitter.

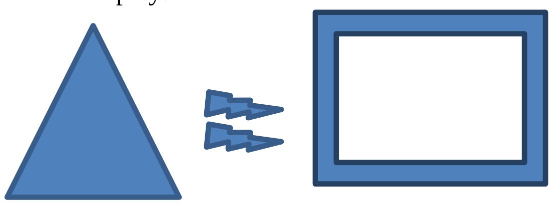
As the wireless antenna detects the pressure, it creates a network route path on the sensor and transmits an I.P address of 192.47.88.2 to the wireless real-time embedded antenna.

The Wi-Fi connect broadcast the received signal and transmit to the HMI real-time software, immediately the HMI real-time software identify the network I.P address application and re-transmit feedback signal to the sensor of the same I.P Address simultaneously.

The Orion application for the network system is used to simulate the movement of the signal transmission by relying on the communication route path developed by the I.P address assigned to both devices. The embedded signal antenna received the network signal broadcasted from the wireless pressure sensor of above 300 meters coverage which displayed on the wireless HMI real-time software for signal display parameter as represented in fig.[4] and fig.[5].

The software dongle analyser simulate the generated raw data parameters from the HMI wireless real-time and developed a real-time application software path for chart or graph representation for the total raw data downloaded between the embedded wireless antenna and the wireless pressure sensor signal capture.

The Laptop with Microsoft window 10 operating system processed the raw data from the dongle software analyser and converted it to a display coloured chart or graph for visual view and display.

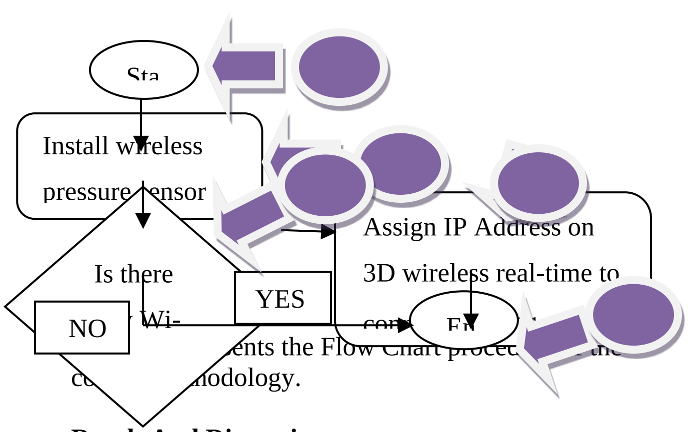


Signal (Tx)Signal (Rx)
WIRELESS (Wi-Fi connect)
ABOVE 300m coverage

Fig.[4].Shows wireless Fig.[5]. Shows wireless pressure sensor HMI Real-time

The (Hwps) Flow Chart

This section highlighted the (HWPS) concept flow chart procedure used in the concept experimental analysis. The flow chart explained the step by step procedure adopted to achieve the solution proposed in section 3.



...ents the Flow Chart procedure ... the ...methodology.

Result And Discussion

This section below highlights the result obtained and the discussion of the result. The validated raw data and the simulation carried out on the experimental analysis of the hybrid wireless pressure sensor concept on 2D wireless real-time application.

Fig.[7]. Represents the simulation Snapshot display screen of HMI Real-time software.

Table [1].Represents the validation table of 2D raw data simulation displays of time taken (hour) and pressure (psi) reading.

TIME(Hour)	PRESSURE(psi)
9:30:02	0.00
10:00:02	500.084
10:30:02	1000.342
11:00:02	1500.775
11:30:02	2000.134
12:00:02	2500.000
12:30:02	3000.816
13:00:02	3500.411
13:30:02	4000.418
14:00:02	4500.535
14:30:02	5000.756
15:00:02	5500.918
15:30:02	6000.197
16:00:02	6500.222
16:30:02	0.00

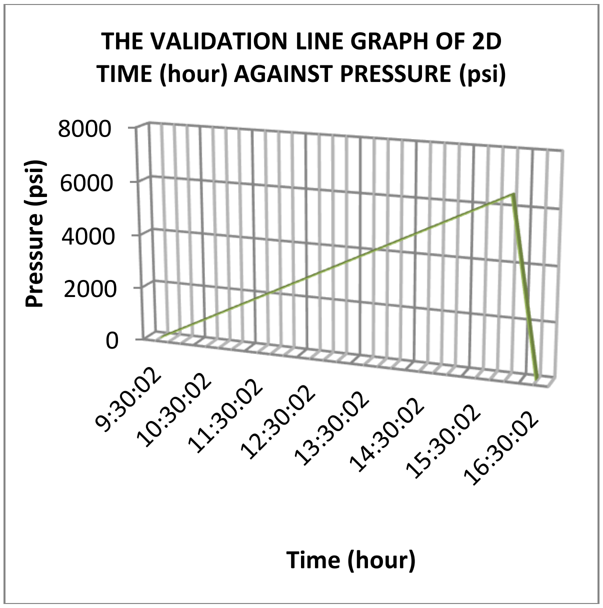


Fig.[8]. Represents the simulationof 2D Line graph of time taken (hour) against pressure (psi).

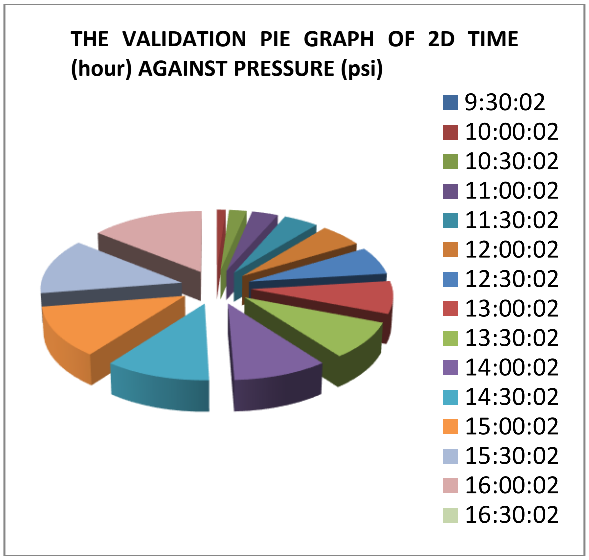


Fig.[10]. Represents the simulation of 2D pie graph of time taken (hour) against pressure (psi).

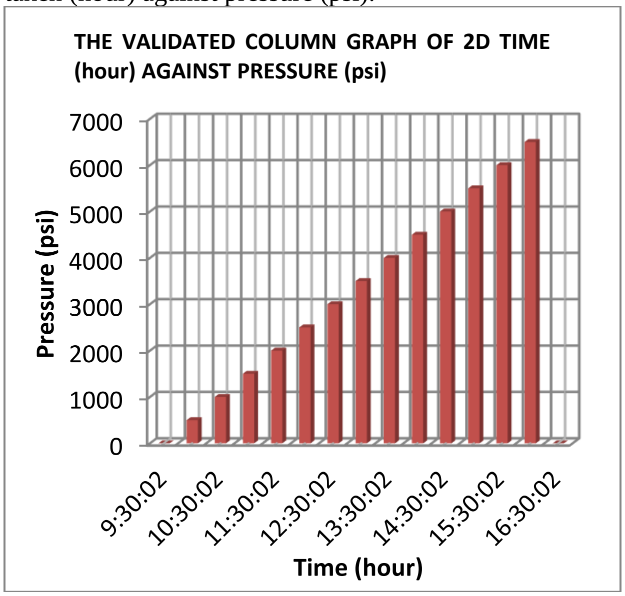


Fig.[9]. Represents the simulation of 2D column graph of time taken (hour) against pressure (psi).

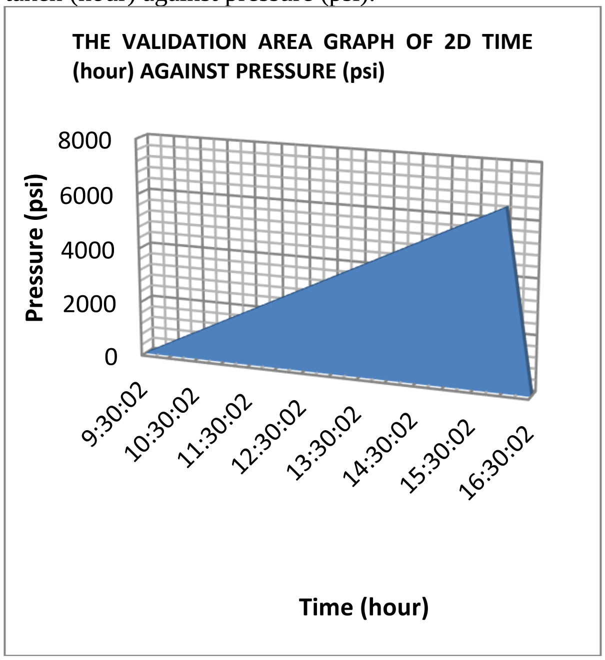


Fig.[11]. Represents the simulation of 2D area graph of time taken (hour) against pressure (psi).

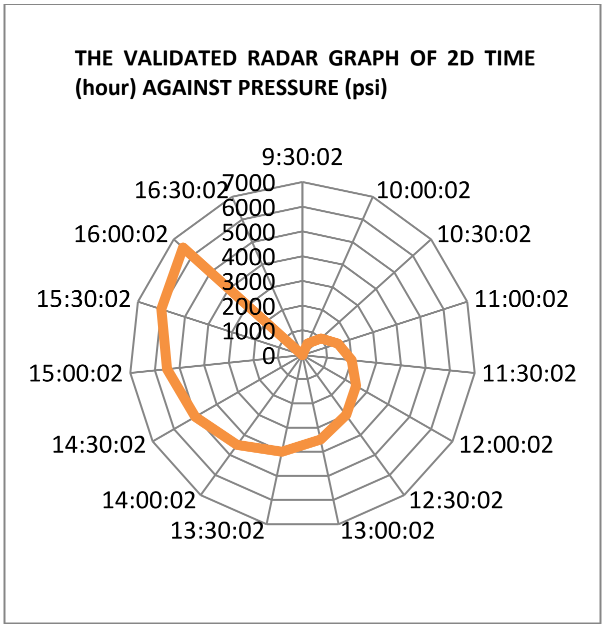


Fig.[12]. Represents the simulation of 2D radar graph of time taken (hour) against pressure (psi).

In fig.[1], as is being analyzed is the wired type of pressure sensor having a sensor signal cable below 100meters long attached to local area network HUB. The transmitting HUB and signal cable have a limiting coverage of pressure signal strength which affect the normality and causes attenuation and signal loss time above 80meters transmitting between the pressure sources to the Real-time device.

In fig.[2], as is being identified is a Local Area Network HUB that transmits and receive signal through the local area network attached to both the wired pressure sensor and the wired real-time HMI. The HUB connect terminated end of signal cable to transmit and receive signal. The maximum distance the HUB can travel is 100meters.

In fig.[3], is being a computer real-time device that is attached to a LAN HUB network not more than 100meter long. The real-time device displays the transmitted signal from the HUB. When the transmitting cable and the HUB could not be access any more, it causes abnormalities and malfunctioning of the wired pressure sensor by displaying erratic parameters and wrong pressure reading.

In fig.[4], as is being implemented in the solution is a wireless pressure sensor that transmit signal through a wireless embedded Wi-Fi connect antenna attached to the sensor. When pressure is detected from the well intervention source(tubing).As the wireless sensor detect the pressure it registered the I.P address on the Wi-Fi connect network and transmit the I.P Address through the embedded antenna on the sensor and communicate the same I.P Address to the wireless real-time software.

In fig.[5], as is being implemented in the application is wireless real-time software. A wireless computer screen that detect the I.P Address coming from the wireless sensor through the Wi-Fi connect and interpret the pressure reading on the display screen. It specifies the route path and the Wi-Fi connect travels up to 300meters and above distance. The wireless real-time then analyzed the raw data captured and generates a time-pressure graph.

In fig.[6], as is being used is the flow chart of the concept methodology and help to analysis and explains the hybrid wireless pressure sensor procedure on 2D wireless real-time application. The flow chart help to analyzed the implementation procedure of the wireless pressure sensor, the Wi-Fi connect and the 2D real-time application principles.

In fig.[7], is representing the validationdisplay screen of the HMI real-time software that shows the front page of the software. It showcase all other parameters involved but the concentration is on pressure 1 and pressure 2 which are the wireless pressure sensor in 2D application on the wireless real-time software. The pressure identifies the amount of pressure captured and generates a 2D graph at the end of the analysis.

In table [1] representing the validation table of 2D raw data simulation displays of time taken (hour) and pressure (psi) reading. From the validation table, the pressure reading from the wireless pressure sensor is such that at about 9:30:02(hour) the pressure was about 0.00(psi) then 30minute later the pressure rose to 500.084 (psi). Between 10:30:02(hour) to 16:00:02(hour) the pressure rose to 5499.88 (psi) and finally the pressure inside the well source is bled off to 0.00 (psi) at 16:30:02 (hr).

In fig.[8] being thevalidation2D pressure Line graph that display the end result of the signal transmission from the hybrid wireless pressure sensor concept to the 2D wireless real-time software. From the green 2D line graph, also the simulation pressure gradually increase from 0.00 (psi) to 6500.222 (psi) until there was a shape pressure drop from the sensor. At 13:15:02 (hour) the pressure midpoint was 3500 (psi).

In fig.[9], being thevalidation2D pressure Column graph that display the simulation end result of the signal transmission such that at 9:30:02 (hour) the starting point of pressure transmission was 0.00 (psi) and end at 16:30:02 (hour) at 0.00 (psi). From the brown 2D column graph, also the simulation highest pressure column was 6500.222 (psi) at 16:00:02 (hour).

In fig.[10],being the validation2D pressure Pie graph that display the signal transmission of the result. It signifies the arrangement of the pressure capability of each block. The colour coding of each block gives the characteristic performance of the pressure level. From the 2D pie block, the highest block is 6500.222 (psi) and the lowest block is 500.084 (psi), given a differential pressure of 6000.138 (psi).

In fig.[11],being the validation2D pressure Area graph that display the wireless pressure sensor signal reaction on the 2D wireless real-time application. From the blue 2D area graph, the blue area is the highest concentration area of interest such that all the transmission and receiving signal spread across the area and any other dimensional areas are neglected. The Wi-Fi connect play a major role to specify the area covered by the signal of above 300 meters from the transmitting signal to the receiving signal with respect to time taken and pressure impact.

In fig.[12], being the validation 2D pressure Radar graph that showcase the signal transmission of the wireless pressure sensor on 2D wireless real-time application. From the orange 2D radar graph, the radar lines are the radar coverage of the sensor. It maintains a search light such that the Wi-Fi connects characterize a radar beam of signal transfer from the sensor to the software in view of the I.P Address path assigned to both wireless devices.

Conclusion

The hybrid wireless pressure sensor (HWPS) concept on 2D wireless real-time application has demonstrated strong efficiency and effectiveness. The concept is robust and sensible. Also the experimental analysis and all the devices used to obtain the results are highly classified and professional. All the 2D pressure table and graphs obtained from the wireless real-time application are validated during the implementation of this hybrid wireless pressure sensor concept on 2D wireless real-time application. More research papers are expected in the nearest future which includes: The wireless proximity sensor concept on 2D wireless real-time application and the wireless magnetic pick-up concept on 2D wireless real-time application.

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